What is claimed is;

1. A motor control apparatus comprising:

a fundamental wave current control device that implements feedback control on a fundamental wave component of a motor current flowing to a 3-phase AC motor in a dq coordinate system rotating in synchronization with the rotation of the motor;

a higher harmonic current control device that implements feedback control on a higher harmonic component of the motor current in a dhqh coordinate system rotating with a frequency which is an integral multiple of a frequency of the fundamental wave component of the motor current;

a command value calculating device that calculates an AC voltage command value by adding an output from the fundamental wave current control device to an output from the higher harmonic current control device and outputs the AC voltage command value to a power conversion device that generates a 3-phase AC voltage corresponding to the AC voltage command value; and

a higher harmonic component eliminating device that eliminates the higher harmonic component of the motor current from a control deviation between a motor current feedback value and a fundamental wave current command value in the fundamental wave current control device.

2. A motor control apparatus according to claim 1, wherein:

the higher harmonic component eliminating device converts higher harmonic current command values in the dhqh coordinate system to higher harmonic current command values in the dq coordinate system through coordinate conversion, and calculates a d-axis current command value and a q-axis current command value both containing the higher harmonic component by adding the higher harmonic current command values resulting from the coordinate conversion to fundamental wave current command values; and

the fundamental wave current control device controls the fundamental wave component of the motor current so as to match motor current feedback values with the d-axis current command value and the q-axis current command value containing the higher harmonic component.

3. A motor control apparatus according to claim 2, further comprising:

a rotation speed detection device that detects a rotation speed of the motor;

a non-interactive control device that compensates for an adverse effect caused by interference of the d-axis and the q-axis on the output from the fundamental wave current control device based upon the fundamental wave current command values and the motor rotation speed; and

a speed electromotive force compensating device that compensates for an adverse effect induced by a speed electromotive force in the motor on the output from the higher harmonic current control device based upon the fundamental wave current command values, the higher harmonic current command values and the motor rotation speed.

4. A motor control apparatus according to claim 2, further comprising:

a rotation speed detection device that detects a rotation speed of the motor;

a non-interactive control device that compensates for an adverse effect caused by interference of the d-axis and the q-axis on the output from the fundamental wave current control device based upon the higher harmonic current command values obtained through a conversion to the dq coordinate system, the d-axis current command value and q-axis current command value, both containing the higher harmonic component and the motor rotation speed; and

a speed electromotive force compensating device that compensates for an adverse effect induced by a speed electromotive force in the motor on the output from the higher harmonic current control device based upon the higher harmonic current command values and the motor rotation speed.

5. A motor control apparatus according to claim 1, wherein:

the higher harmonic component eliminating device converts higher harmonic current command values in the dhqh coordinate system to higher harmonic current command values in the dq coordinate system through coordinate conversion and calculates motor current feedback values which are the fundamental wave component by subtracting the higher harmonic current command values resulting from the coordinate conversion from motor current feedback values in the fundamental wave current control device; and

the fundamental wave current control device controls the fundamental wave component of the motor current so as to match the motor current feedback values which are the fundamental wave component with fundamental wave current command values.

6. A motor control apparatus according to claim 1, wherein:

the higher harmonic component eliminating device executes high-pass filter processing on the motor current feedback value and calculates the motor current feedback value which is the fundamental wave component by subtracting results of the high-pass filter processing from the motor current feedback value; and

the fundamental wave current control device controls the fundamental wave component of the motor current so as to

match the motor current feedback value which is the fundamental wave component with the fundamental wave current command value.

7. A motor control apparatus according to claim 1, wherein:

the higher harmonic component eliminating device executes low-pass filter processing on the motor current feedback value to calculate the motor current feedback value which is the fundamental wave component; and

the fundamental wave current control device controls the fundamental wave component of the motor current so as to match the motor current feedback value which is the fundamental wave component with the fundamental wave current command value.

8. A motor control apparatus comprising:

a fundamental wave current control means for implementing feedback control on a fundamental wave component of a motor current flowing to a 3-phase AC motor in a dq coordinate system rotating in synchronization with the rotation of the motor;

a higher harmonic current control means for implementing feedback control on a higher harmonic component of the motor current in a dhqh coordinate system rotating with a frequency which is an integral multiple of a frequency of the fundamental wave component of the motor current;

a command value calculation means for calculating an

AC voltage command value by adding an output from the fundamental wave current control means to an output from the higher harmonic current control means and outputs the the AC voltage command value to a power conversion means for generating a 3-phase AC voltage corresponding to the AC voltage command value; and

a higher harmonic component elimination means for eliminating the higher harmonic component of the motor current from a control deviation between a motor current feedback value and a fundamental wave current command value in the fundamental wave current control means.

9. A method for controlling a motor by employing circuits including a fundamental wave current control circuit that implements feedback control on a fundamental wave component of a motor current in a dq coordinate system rotating in synchronization with the rotation of the motor and a higher harmonic current control circuit that implements feedback control on a higher harmonic component of the motor current in a dhqh coordinate system rotating with a frequency which is an integral multiple of the frequency of the fundamental wave component of the motor current, comprising:

eliminating the higher harmonic components of the motor current from a control deviation between a fundamental wave current command value and a motor current feedback value in

the fundamental wave current control circuit;

calculating an AC voltage command value by adding an output from the fundamental wave current control circuit from which the higher harmonic component has been eliminated to an output from the higher harmonic current control circuit; and

generating a 3-phase AC voltage corresponding to the AC voltage command value and applying the 3-phase AC voltage to a 3-phase AC motor.